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10/589,898	08/18/2006	Yukihiro Nakasaka	129122	2477

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EXAMINER
VILAKAZI, SIZO BINDA

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4147	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)	
Office Action Summary	10/589,898	NAKASAKA, YUKIHIRO	
	Examiner	Art Unit	
	SIZO B. VILAKAZI	4147	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *18 August 2006*.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-19* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☐ Claim(s) *1,5,9,13 and 16-19* is/are rejected.

7) ☐ Claim(s) *2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *18 August 2006* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some * c) ☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *08/18/2006*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> a.   A patent may not be obtained though the invention is not identically disclosed or
> described as set forth in section 102 of this title, if the differences between the subject matter
> sought to be patented and the prior art are such that the subject matter as a whole would
> have been obvious at the time the invention was made to a person having ordinary skill in the
> art to which said subject matter pertains. Patentability shall not be negatived by the manner in
> which the invention was made.

2.   Claims 1, 5, 9, 13, and 16-19 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Shomura (US Patent No. 6,170,465 B1) in view of Ishikawa et al. (US

Patent No. 6,975,934 B2) and Mashiki (US Patent No. 6,176,220 B1).

3.   In Re claim 1, Shomura discloses

a.   An injection amount control means for changing a fuel injection amount

from an injection amount for stoichiometric operation to either an increased

amount or a decreased amount (Fig. 1, item 23, Column 7, Lines 36-43, and

Lines 54-62)

b.   A computation means for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount is changed by the

injection amount control means (Fig. 1, item 39, Column 7, Lines 54-62 and

Column 8, Lines 10-14)

    c.   that the various detected values detected by the various sensors, or the values stored in the control unit could be output to the vehicle's tachometer or other such device (Column 14, Lines 38-67)

    d.   that the rotation speed change is stored in the control unit (Column 10, Lines 17-22), therefore it is a value capable of being output

4.   With regards to the "injection amount control means for changing a fuel injection amount from an injection amount for stoichiometric operation to either an increased amount or a decreased amount" within claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. The "injection amount control means for changing a fuel injection amount from an injection amount for stoichiometric operation to either an increased amount or a decreased amount" is explained on Page 29, Lines 3-14 and Fig. 1, item 18 in the specification. Shomura teaches a means for changing the fuel injection amount (Column 7, Lines 36-43, and Lines 54-62). The method taught by Shomura is considered to be equivalent because it performs the same function in substantially the same way and produces substantially the same result as the corresponding element in the applicant's specification.

5.   With regards to the "computation means for determining the amount of a torque or rotation speed change that occurs when the fuel injection amount is changed by the injection amount control means" within claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. The "computation means for determining the amount of a torque or rotation speed change that occurs when the fuel injection amount is changed by the injection amount control means" is

explained on Page 29, Lines 15-21 in the specification. Shomura teaches a means for determining the rotation speed change that occurs when the fuel injection amount is changed (Column 7, Lines 54-62 and Column 8, Lines 10-14). The method taught by Shomura is considered to be equivalent because it performs the same function in substantially the same way and produces substantially the same result as the corresponding element in the applicant's specification.

6.   With regards to the "output means for outputting the torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation among the cylinders" within claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. The "output means for outputting the torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation among the cylinders" is explained on Page 30, Lines 9-26 in the specification.

7.   Shomura does not disclose output means for outputting the torque or rotation speed change amount determined by the computation means *as an index value that indicates the degree of intake air amount variation among the cylinders*

8.   However, Ishikawa et al. acknowledge that the variation in air intake amount can be detected or corrected based on the engine torque or rotational speed variation resulting from a change in fuel injection amount (Column 1, Line 64 through Column 2 Line 40)

9.   Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified system disclosed by Shomura with the information disclosed by Ishikawa et al. to arrive at an output means for outputting torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation among the cylinders, with the purpose in mind of adjusting the intake air in accordance with the torque variation (Ishikawa, Col. 2, line 36-41).

10.   In Re claim 5, Shomura discloses

    a.   An injection amount control means for changing a fuel injection amount for a particular one of the cylinders from an injection amount for stoichiometric operation to either an increased amount or a decreased amount (Column 7, Lines 36-43 and Lines 54-62, Column 10, Lines 61-67)

    b.   A computation means for determining the amount of a torque or rotation speed change that occurs when the fuel injection amount for the particular cylinder is changed by the injection amount control means (Column 7, Lines 54-62 and Column 8, Lines 10-14)

    c.   that the various detected values detected by the various sensors, or the values stored in the control unit could be output to the vehicle's tachometer or other such device (Column 14, Lines 38-67)

    d.   that the rotation speed change is stored in the control unit (Column 10, Lines 17-22), therefore it is a value capable of being output

11.   With regards to the "An injection amount control means for changing a fuel

injection amount for a particular one of the cylinders from an injection amount for

stoichiometric operation to either an increased amount or a decreased amount" within

claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes

35 USC 112 6th paragraph. The "injection amount control means for changing a fuel

injection amount from an injection amount for stoichiometric operation to either an

increased amount or a decreased amount" is explained on Page 35, Lines 3-18 and

Fig. 1, item 18 in the specification. Shomura teaches a means for changing the fuel

injection amount (Column 7, Lines 36-43, and Lines 54-62). The method taught by

Shomura is considered to be equivalent because it performs the same function in

substantially the same way and produces substantially the same result as the

corresponding element in the applicant's specification.

12.   With regards to the "computation means for determining the amount of a torque

or rotation speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the injection amount control means" within claim 1, this limitation

meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th

paragraph. The "computation means for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount for the particular cylinder is

changed by the injection amount control means" is explained on Page 35, Lines 19-22

in the specification. Shomura teaches a means for determining the rotation speed

change that occurs when the fuel injection amount is changed (Column 7, Lines 54-62

and Column 8, Lines 10-14). The method taught by Shomura is considered to be

equivalent because it performs the same function in substantially the same way and produces substantially the same result as the corresponding element in the applicant's specification.

13.   With regards to the "output means for outputting the torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation in the particular cylinder" within claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. The "output means for outputting the torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation in the particular cylinder" is explained on Page 36, Lines 1-21 in the specification.

14.   Shomura does not disclose output means for outputting the torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation in the particular cylinder.

15.   However, Ishikawa et al. acknowledge that the variation in air intake amount can be detected or corrected based on the engine torque or rotational speed variation resulting from a change in fuel injection amount (Column 1, Line 64 through Column 2 Line 40).

16.   Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified system disclosed by Shomura with the information disclosed by Ishikawa et al. to arrive at an output means for outputting torque or rotation speed change amount determined by the computation means as an

index value that indicates the degree of intake air amount variation in the particular

cylinder, with the purpose in mind of adjusting the intake air in accordance with the

torque variation (Ishikawa, Col. 2, line 36-41).

17.   In Re claim 9, Shomura discloses

     a.   An injection amount control means for changing a fuel injection amount

from an injection amount for stoichiometric operation to either an increased

amount or a decreased amount (Column 7, Lines 36-43 and Lines 54-62,

Column 10, Lines 61-67)

     b.   A computation means for determining on an individual cylinder basis the

amount of a torque or rotation speed change that occurs when the fuel injection

amount is changed by the injection amount control means (Column 7, Lines 54-

62 and Column 8, Lines 10-14)

     c.   that the various detected values detected by the various sensors, or the

values stored in the control unit could be output to the vehicle's tachometer or

other such device (Column 14, Lines 38-67)

     d.   that the rotation speed change is stored in the control unit (Column 10,

Lines 17-22), therefore it is a value capable of being output

18.   With regards to the "injection amount control means for changing a fuel injection

amount for a particular one of the cylinders from an injection amount for stoichiometric

operation to either an increased amount or a decreased amount" within claim 1, this

limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112

6th paragraph. The "injection amount control means for changing a fuel injection

amount from an injection amount for stoichiometric operation to either an increased

amount or a decreased amount" is explained on Page 41, Lines 5-7 and Fig. 1, item 18

in the specification. Shomura teaches a means for changing the fuel injection amount

(Column 7, Lines 36-43, and Lines 54-62). The method taught by Shomura is

considered to be equivalent because it performs the same function in substantially the

same way and produces substantially the same result as the corresponding element in

the applicant's specification.

19.   With regards to the "computation means for determining on an individual cylinder

basis the amount of a torque or rotation speed change that occurs when the fuel

injection amount is changed by the injection amount control means" within claim 1, this

limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112

6th paragraph. The "computation means for determining on an individual cylinder basis

the amount of a torque or rotation speed change that occurs when the fuel injection

amount is changed by the injection amount control means" is explained on Page 41,

Lines 11-14 in the specification. Shomura teaches a means for determining the rotation

speed change that occurs when the fuel injection amount is changed (Column 7, Lines

54-62 and Column 8, Lines 10-14). The method taught by Shomura is considered to be

equivalent because it performs the same function in substantially the same way and

produces substantially the same result as the corresponding element in the applicant's

specification.

20.   With regards to the "output means for outputting the torque or rotation speed

change amount determined by the computation means as an index value that indicates

the degree of intake air amount variation in an individual cylinder" within claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. The "output means for outputting the torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation in an individual cylinder" is explained on Page 41, Lines 25 through Page 42, Line 22 in the specification.

21.   Shomura does not disclose output means for outputting the torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation in an individual cylinder.

22.   However, Ishikawa et al. acknowledge that the variation in air intake amount can be detected or corrected based on the engine torque or rotational speed variation resulting from a change in fuel injection amount (Column 1, Line 64 through Column 2 Line 24).

23.   Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified system disclosed by Shomura with the information disclosed by Ishikawa et al. to arrive at an output means for outputting torque or rotation speed change amount determined by the computation means as an index value that indicates the degree of intake air amount variation in an individual cylinder, with the purpose in mind of adjusting the intake air in accordance with the torque variation (Ishikawa, Col. 2, line 36-41).

24.   In Re claim 13, Shomura discloses:

a.   first injection amount control means for changing the fuel injection amount

for a particular one of the cylinders from an injection amount for stoichiometric

operation to an increased amount (Fig. 1, item 23, Column 7, Lines 36-43, and

Lines 54-62)

b.   output means for outputting the torque or rotation speed change amount

determined by the first computation means and the torque or rotation speed

change amount determined by the second computation means as index values

that indicate the degree of intake air amount variation in the particular cylinder

(see claim 1 rejection above)

25.   Shomura does not disclose:

c.   first computation means for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the first injection amount control means

d.   second injection amount control means, which, when the torque or rotation

speed change amount determined by the first computation means is not greater

than a predetermined reference value, decreases the fuel injection amount for

the particular cylinder from the injection amount for stoichiometric operation

e.   second computation means for determining the amount of a torque or

rotation speed change that occurs when the fuel injection amount for the

particular cylinder is changed by the second injection amount control means (

26.   However, Mashiki discloses:

c.   first computation means for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the first injection amount control means (Column 9, Lines

54-58)

d.   second injection amount control means, which, when the torque or rotation

speed change amount determined by the first computation means is not greater

than a predetermined reference value, decreases the fuel injection amount for

the particular cylinder from the injection amount for stoichiometric operation

(Column 10, Line 58 through Column 11, Line 17)

e.   second computation means for determining the amount of a torque or

rotation speed change that occurs when the fuel injection amount for the

particular cylinder is changed by the second injection amount control means

(Column 9, Lines 22-29)

27.   With regards to the "first computation means for determining the amount of a

torque or rotation speed change that occurs when the fuel injection amount for the

particular cylinder is changed by the first injection amount control means" within claim 1,

this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC

112 6th paragraph. The "first computation means for determining the amount of a torque

or rotation speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the first injection amount control means" is explained on Page

55, Line 26 through Page 56, Line 1in the specification. Mashiki teaches a means for

determining the amount of a torque or rotation speed change that occurs when the fuel

injection amount for the particular cylinder is changed by the first injection amount control means (Column 9, Lines 54-58). The method taught by Mashiki is considered to be equivalent because it performs the same function in substantially the same way and produces substantially the same result as the corresponding element in the applicant's specification.

28.   With regards to the "second injection amount control means, which, when the torque or rotation speed change amount determined by the first computation means is not greater than a predetermined reference value, decreases the fuel injection amount for the particular cylinder from the injection amount for stoichiometric operation" within claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. The "second injection amount control means, which, when the torque or rotation speed change amount determined by the first computation means is not greater than a predetermined reference value, decreases the fuel injection amount for the particular cylinder from the injection amount for stoichiometric operation" is explained on Page 57, Lines 11-16 in the specification. Mashiki teaches a means, which, when the torque or rotation speed change amount determined by the first computation means is not greater than a predetermined reference value, decreases the fuel injection amount for the particular cylinder from the injection amount for stoichiometric operation (Column 10, Line 58 through Column 11, Line 17). The method taught by Mashiki is considered to be equivalent because it performs the same function in substantially the same way and produces substantially the same result as the corresponding element in the applicant's specification.

29.   With regards to the "second computation means for determining the amount of a torque or rotation speed change that occurs when the fuel injection amount for the particular cylinder is changed by the second injection amount control means" within claim 1, this limitation meets the three prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. The "second computation means for determining the amount of a torque or rotation speed change that occurs when the fuel injection amount for the particular cylinder is changed by the second injection amount control means" is explained on Page 57, Lines 16-18 in the specification. Mashiki teaches a means for determining the amount of a torque or rotation speed change that occurs when the fuel injection amount for the particular cylinder is changed by the second injection amount control means (Column 9, Lines 22-29). The method taught by Mashiki is considered to be equivalent because it performs the same function in substantially the same way and produces substantially the same result as the corresponding element in the applicant's specification.

30.   Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified system disclosed by Shomura with the invention disclosed by Mashiki to arrive at the current invention.

31.   In Re claims 16-18, Shomura discloses

       a.   An injection amount control unit for changing a fuel injection amount from an injection amount for stoichiometric operation to either an increased amount or a decreased amount in a particular cylinder, or on an individual cylinder basis (Column 5, Lines 24-26, and Column 7, Lines 17-30)

b.   A computation unit for determining on an individual cylinder basis the

amount of a torque or rotation speed change that occurs when the fuel injection

amount is changed by the injection amount control means in a particular cylinder,

or on an individual cylinder basis (Column 8, Lines 10-14)

c.   An output unit for outputting the torque or rotation speed change amount

determined by the computation unit as an index value that indicates the degree

of intake air amount variations among the cylinders (Column 14, Lines 38-67)

32.   In Re claim 19, Shomura discloses:

a.   first injection amount control unit for changing the fuel injection amount for

a particular one of the cylinders from an injection amount for stoichiometric

operation to an increased amount (Column 5, Lines 24-26, and Column 7, Lines

17-30)

b.   output unit for outputting the torque or rotation speed change amount

determined by the first computation means and the torque or rotation speed

change amount determined by the second computation means as index values

that indicate the degree of intake air amount variation in the particular cylinder

(Column 14, Lines 38-67)

33.   Shomura does not disclose:

c.   first computation unit for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the first injection amount control means

d.   second injection amount control unit, which, when the torque or rotation

speed change amount determined by the first computation means is not greater

than a predetermined reference value, decreases the fuel injection amount for

the particular cylinder from the injection amount for stoichiometric operation

e.   second computation unit for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the second injection amount control means (

34.   However, Mashiki discloses:

f.   first computation unit for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the first injection amount control means (Column 8, Lines

60-65)

g.   second injection amount control unit, which, when the torque or rotation

speed change amount determined by the first computation means is not greater

than a predetermined reference value, decreases the fuel injection amount for

the particular cylinder from the injection amount for stoichiometric operation

(Column 8, Lines 38-42)

h.   second computation unit for determining the amount of a torque or rotation

speed change that occurs when the fuel injection amount for the particular

cylinder is changed by the second injection amount control means (Column 8,

Lines 60-65)

35.   Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified system disclosed by Shomura with the invention disclosed by Mashiki to arrive at the current invention.

Allowable Subject Matter

36.   Claims 2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

37.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yomogida (US Pat. 6,513,496 B2) controls the combustion condition of the cylinders by adjusting the fuel injection amount based on engine speed. Frelund et al. (US Pat. 6,598,589 B2) use an air/fuel lookup table in conjunction with monitoring engine conditions such as engine misfire, engine speed, or manifold pressure to control the combustion conditions of the engine. Maloney (US Pat. 6,481,273 B2) tests the frequency response of an air fuel sensor. Fujiki (US Pat. 5,447,061) discloses a misfire detection system. Iwata (US Pat. 6,079,511) discloses a method of controlling an engines air fuel ratio.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIZO B. VILAKAZI whose telephone number is (571)270-3926. The examiner can normally be reached on M- F: 9:00am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Nguyen can be reached on (571) 272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

<div style="text-align:right">

Sizo B Vilakazi
Examiner
Art Unit 4147

</div>

/George Nguyen/
Supervisory Patent Examiner, Art Unit 4147

NINH H. NGUYEN
PRIMARY EXAMINER
01/22/08